

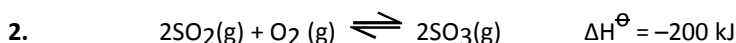
T07D02 – 7.1-7.2 IB Practice

Name.....



What is the equilibrium constant expression for the reaction above?

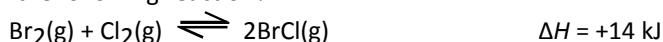
- A. $K_c = \frac{[\text{ICl}_3]}{[\text{I}_2][\text{Cl}_2]}$
 B. $K_c = \frac{2[\text{ICl}_3]}{3[\text{I}_2][\text{Cl}_2]}$
 C. $K_c = \frac{2[\text{ICl}_3]}{[\text{I}_2] + 3[\text{Cl}_2]}$
 D. $K_c = \frac{[\text{ICl}_3]^2}{[\text{I}_2][\text{Cl}_2]^3}$



According to the above information, what temperature and pressure conditions produce the greatest amount of SO_3 ?

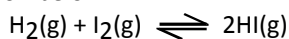
	Temperature	Pressure
A.	low	low
B.	low	high
C.	high	high
D.	high	low

3. What will happen to the position of equilibrium and the value of the equilibrium constant when the temperature is increased in the following reaction?



	Position of equilibrium	Value of equilibrium constant
A.	Shifts towards the reactants	Decreases
B.	Shifts towards the reactants	Increases
C.	Shifts towards the products	Decreases
D.	Shifts towards the products	Increases

4. For the reaction below



at a certain temperature, the equilibrium concentrations are (in mol dm^{-3})

$[\text{H}_2] = 0.30, [\text{I}_2] = 0.30, [\text{HI}] = 3.0$

What is the value of K ?

- A. 5.0
 B. 10
 C. 15
 D. 100
5. Which statements are correct for a reaction at equilibrium?
- The forward and reverse reactions both continue.
 - The rates of the forward and reverse reactions are equal.
 - The concentrations of reactants and products are equal.
- A. I and II only
 B. I and III only
 C. II and III only
 D. I, II and III

6. In the gaseous state, methane and steam react to form hydrogen and carbon dioxide.

(i) Write an equation for the endothermic equilibrium reaction. Deduce the equilibrium expression for the reaction and state its units.

(4)

- (ii) Deduce and explain the conditions of temperature and pressure under which the forward reaction is favoured.

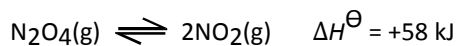
(4)

- (iii) Explain, at the molecular level, why the reaction is carried out at high pressure in industry.

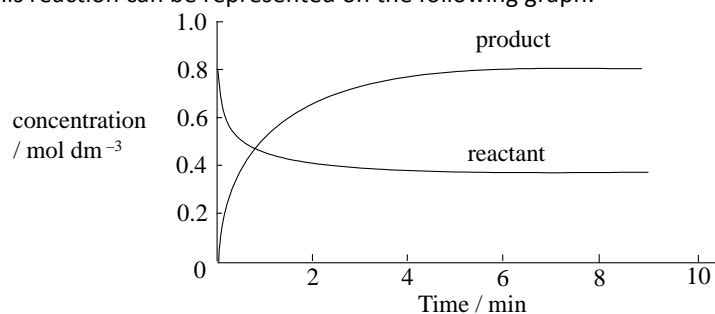
(2)

(Total 10 marks)

7. The equation for one reversible reaction involving oxides of nitrogen is shown below:



Experimental data for this reaction can be represented on the following graph:



- (i) Write an expression for the equilibrium constant, K_c , for the reaction. Explain the significance of the horizontal parts of the lines on the graph. State what can be deduced about the magnitude of K_c for the reaction, giving a reason.

(4)

- (ii) Use Le Chatelier's principle to predict and explain the effect of increasing the temperature on the position of equilibrium.

(2)

- (iii) Use Le Chatelier's principle to predict and explain the effect of increasing the pressure on the position of equilibrium.

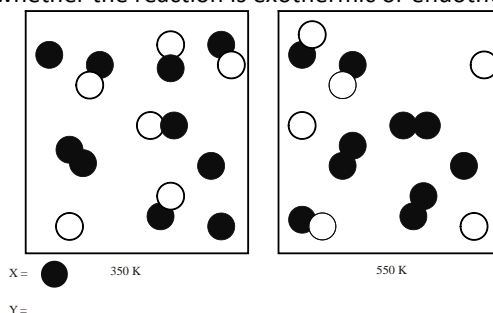
(2)

- (iv) State and explain the effects of a catalyst on the forward and reverse reactions, on the position of equilibrium and on the value of K_c .

(6)

(Total 14 marks)

8. The diagrams below represent equilibrium mixtures for the reaction $\text{Y} + \text{X}_2 \rightleftharpoons \text{XY} + \text{X}$ at 350 K and 550 K respectively. Deduce and explain whether the reaction is exothermic or endothermic.



(Total 2 marks)